WHAT IS CLAIMED IS:

1. A lens control apparatus that outputs, to a driving unit that drives a lens in an optical axis direction, a driving signal for moving the lens, the lens control apparatus comprising:

a position sensor that outputs a detection signal that changes periodically in accordance with a movement of the lens;

a first calculation unit that calculates a differential value between a phase component of position detection data that have been obtained based on a detection signal of the position sensor when the lens has been moved to a predetermined reference position and a phase component of position control data for controlling the position of the lens and corresponding to the reference position;

a second calculation unit that calculates the target position in the position control data based on the position detection data and the differential value; and

a control circuit that outputs the driving signal based on the differential value and the target position in the position control data.

2. The lens control apparatus according to claim 1,

wherein the position sensor comprises a magnet member that is periodically magnetized, and a magnetic detector that moves relative to the magnet member when the lens is

moved and that outputs a plurality of the position detection signals having different phases, in response to magnetic changes due to that movement.

3. The lens control apparatus according to claim 1,

wherein the position sensor comprises an optical scale member having a reflection surface whose shape changes periodically, and an optical detector that moves relative to the optical scale member when the lens is moved and that outputs a plurality of the position detection signals having different phases, in response to a received light amount among light that has been projected to and reflected by the scale member, which changes due to the movement.

4. A camera comprising;

a lens;

a driving unit that drives the lens in an optical axis direction, and

a lens control apparatus according to claim 1.

5. A lens control method for a control apparatus having a position sensor that outputs a detection signal that changes periodically in accordance with a movement of a lens, and outputting, to a driving unit that drives the lens in an optical axis direction, a driving signal for moving the lens to a target position, the method

comprising:

a first step of calculating a differential value between a phase component of position detection data that have been obtained based on a detection signal of the position sensor when the lens has been moved to a predetermined reference position and a phase component of position control data for controlling the position of the lens and corresponding to the reference position;

a second step of calculating the target position in the position control data based on the position detection data and the differential value; and

a third step of outputting the driving signal based on the differential value and the target position in the position control data.